Bacteria TMDLs in the Cedar and Licking Run Watersheds

First Public Meeting

July 10, 2003

Presentation Overview

1. **Overview of Virginia's TMDL Program**
2. Applicable Water Quality Standard
3. Cedar and Licking Run Impairments

What is a TMDL ?

- TMDL stands for **Total Maximum Daily Load**
- A TMDL is a **pollution budget**
- A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet **water quality standards**
- A TMDL includes an **allocation** of that maximum amount to the pollutant's sources

TMDL Equation

A TMDL is summarized as:

TMDL = Sum of WLA + Sum of LA + MOS

Where:

- TMDL = Total Maximum Daily Load
- WLA = Waste Load Allocation (point sources)
- LA = Load Allocation (nonpoint sources)
- MOS = Margin of Safety

How is a TMDL developed?

- Identify all sources of a given pollutant within the watershed
- Calculate the amount of pollutant entering the stream from each source
- Calculate the pollutant reductions needed, by source, to attain water quality standards
- Allocate the allowable loading to each source and include a margin of safety

When are TMDLs needed?

- State and federal law require TMDLs to be developed for **impaired** waters
- Impaired waters do not meet applicable **water quality standards** (WQS)
- Waters that do not meet WQS do not support their **designated use(s)**
- For bacteria impairments, the designated use that is affected is the **recreational use**

Regulatory Basis of TMDLs

- TMDLs required by Federal and State law
  - 1972 Clean Water Act (CWA), Section 303(d)
  - 1997 Water Quality Monitoring, Information and Restoration Act (WQMIRA)
- 1998 lawsuit filed by the American Canoe Association and the American Littoral Society against EPA for failure to comply with CWA §303(d) in Virginia
- 1999 Consent Decree requiring EPA and Virginia to complete 636 TMDLs by 2010

Regulatory Requirements

- Both state and federal law require:
  - Establishment of water quality standards
  - Monitoring of water quality in surface waters
  - Assessment of water quality in surface waters
  - Listing of waters that do not meet water quality standards (impaired waters)
  - Development of TMDLs for impaired waters
- State law requires, and federal law recommends:
  - Development of a TMDL Implementation Plan

Roles of DEQ and DCR in TMDL and IP Development

- DEQ is the lead for TMDL development, including submittal to EPA
- DCR is the lead for TMDL Implementation Plan (IP) development
- DEQ is responsible for ensuring public participation in the TMDL program

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Water Quality Standards

- Water Quality Standards (WQS):
  - set by states and approved by EPA
  - set **numeric** and **narrative** limits on pollutants
  - consist of **designated use(s)** and water quality **criteria**
- Purpose of WQS:
  - **protection** of 5 designated uses (aquatic life, fish consumption, shellfish, recreation, drinking water)
  - **restoration** of state waters to meet criteria

Applicable Designated Use

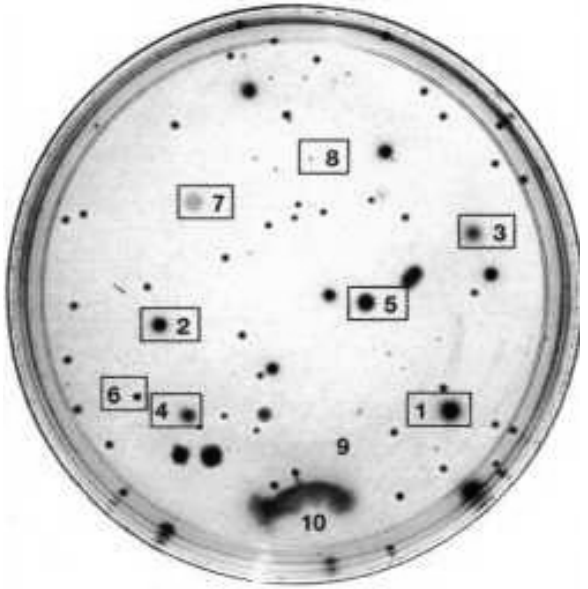
- All surface waters in Virginia are currently designated for **primary contact recreation** (e.g. swimming)
- In March 2003, a **secondary contact recreation** use designation (e.g. wading, fishing) was added to the WQS
  - Five times the primary contact criteria
  - Individual waters will only be considered for reclassification after TMDL implementation has been tried using reasonable BMPs
  - Effective date pending EPA approval

Pollutant of Concern

- ***Fecal bacteria*** are found in the digestive tract of humans and warm blooded animals
- Fecal bacteria are an indicator of the potential **presence of pathogens** in waterbodies
- The presence of fecal bacteria in water samples is a strong indicator of recent **sewage or animal waste contamination**

Sampling for Bacteria

- Stream samples are collected in sterile 125 mL sample bottles
- Samples are filtered to deposit bacteria on filters
- Filters are incubated, allowing individual bacteria to grow into visible colonies
- Colonies are counted to give a concentration of colony forming units (cfu) per 100 mL



Old Criteria

- Indicator species: **fecal coliform**
  - used in listing Cedar and Licking Runs

- **Instantaneous max**: **1,000 cfu/100 mL**
- Applicable for data sets with 1 or fewer samples in 30 days
- Used in **water quality assessment** because monitoring is usually conducted bimonthly

- **Geometric mean: 200 cfu/100 mL**
- Applicable for data sets with 2 or more samples in 30 days
- Used in **TMDL development** because model output is usually daily

New Criteria

- Indicator species for freshwater: ***E. coli***
  - change in indicator species from fecal coliform to ***E. coli*** (fresh water)
  - *E. coli* bacteria are a **subset of fecal coliform** bacteria and correlate better with swimming-associated illness

- **Instantaneous max**: **235 cfu/100 mL**
- Applicable for all data sets; no samples may exceed the maximum

- **Geometric mean: 126 cfu/100 mL**
- Applicable for data sets with 2 or more samples in a calendar month

Interim Criteria

- Indicator species: **fecal coliform**
  - will be phased out when 12 *E. coli* observations available or after June 30, 2008, whichever comes first
  - will not be used to assess compliance

- **Instantaneous max**: **400 cfu/100 mL**
- Applicable for all data sets; no more than 10% of samples in a calendar month may exceed the maximum

- **Geometric mean: 200 cfu/100 mL**
- Applicable for data sets with 2 or more samples in a calendar month

Summary of Changes in Primary Contact Criteria

Indicator	Status	Instantaneous Maximum (cfu/100mL)	Geometric Mean (cfu/100 mL)
Fecal Coliform	Old	1,000	200
E. coli	New	235	126
Fecal Coliform	Interim	400	200

- Changes went into effect on January 15, 2003
- Both New *E. coli* and Interim Fecal Coliform criteria apply
- Fecal coliform criteria will be phased out entirely once 12 *E. coli* samples have been collected or after June 30, 2008

Comparison of the Old Fecal Coliform and New *E. coli* Criteria

Old FC (cfu/100mL)	Interim FC (cfu/100mL)	FC translated to EC* (cfu/100mL)	New EC (cfu/100mL)
200	200	129	126
	400	243	235
1,000		565	

* Based on regression model between 493 dual data points

Note: FC = Fecal Coliform, EC = *Escherichia Coli*

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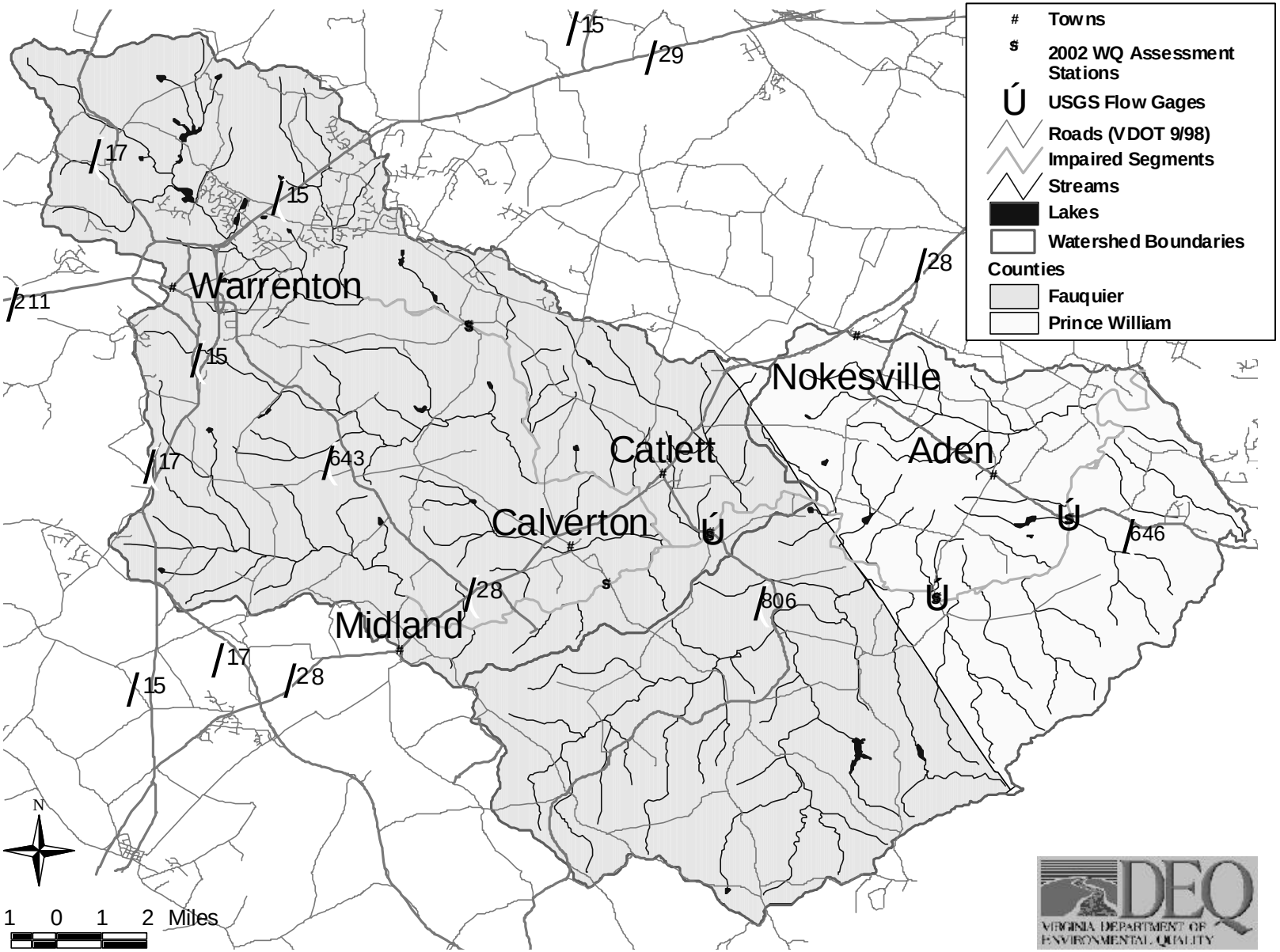
Impairments in the Cedar and Licking Run Watersheds

WATER BODY	CAUSE	STREAM NAME	LENGTH (Miles)	YEARS LISTED
VAN-A17R, VAN-A18R	Bacteria	Cedar Run (from Mill Run to Occoquan River)	28.32	1996, 1998, 2002
VAN-A17R	Bacteria	Licking Run (from mouth of Germantown Lake to Cedar Run)	6.58	1998, 2002

Map of the Cedar Run Watershed



2002 Water Quality Assessment Results for Bacteria

WBID	Monitoring Station	Type*	Fecal Coliform**			
N-A17R	1aCER016.46	A,B	4	/	24	P
N-A17R	1aCER025.25	A	5	/	23	P
N-A17R	1aLIL001.43	A	5	/	24	P
N-A18R	1aCER006.00	A	10	/	49	P
N-A18R	1aCER009.52	SS	3	/	11	N

* Station Types: A = ambient, B = biological, SS = special study

** Impairment Status: P = partially supporting, N = not supporting

Bacteria TMDLs in the Cedar and Licking Run Watersheds

- First public Meeting
  - July 10 2003, Catlett, VA
- Second Public Meeting
  - October 23, 2003, Nokesville, VA
- Final public meeting will be held at the latest in **March 2004** to allow 30 days for public comment before submittal to EPA
- TMDLs must be submitted by **May 1, 2004**

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Kate Bennett
Regional TMDL Coordinator
Northern Virginia Regional Office
VA Department of Environmental Quality
13901 Crown Ct.
Woodbridge, VA 22193
Phone: (703) 583-3896
Fax: (703) 583-3841
E-mail: kebennett@deq.state.va.us